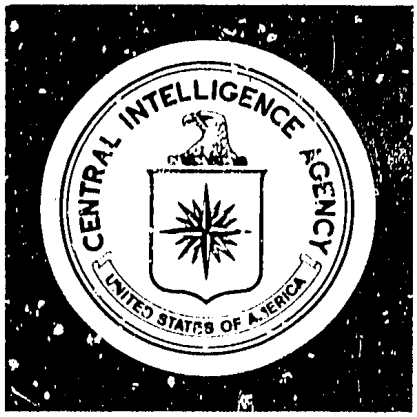
Approved For Release 2003/09/29 : CIA-RDP86T00608R000500110004-2



Research Aid

Production of Machinery and Equipment in the Peoples Republic of China

A (ER) 75-63
May 1975

Approved For Release 2003/09/29 : CIA-RDP86T00608R000500110004-2

Approved For Release 2003/09/29 : CIA-RDP86T00608R000500110004-2

Production of Machinery and Equipment in the Peoples Republic of China

May 1975

Approved For Release 2003/09/29 : CIA-RDP86T00608R000500110004-2

Production of Machinery and Equipment in the Peoples Republic of China

This handbook presents estimates of China's annual production of some 30 major items of machinery and equipment for all or parts of 1949 73. It is intended to supplement other research on the topic.[1]

Table 1 groups the estimates in the order in which the products appear in the State Statistical Bureau's standard industrial classification code[2]; it also serves as an index of page numbers for locating specific production series. Table 2 lists the space-saving abbreviations adopted for citing the principal sources of information.

Tables 3 through 9 present the estimates, with footnotes indicating the sources and methodologies used in deriving the estimates. Because estimating production by China's merchant shipbuilding industry involved unique difficulties, the methodology is described separately in Appendix A.

Note: Data in parentheses are calculated residuals. Computations in the methodology are, in general, based on unrounded data, and the results have been rounded.

[1] Kang Chao, *Capital Formation in Mainland China, 1952 65*, Berkeley, University of California Press, 1974; Chu-yuan Cheng, *The Machine-Building Industry in Communist China*, New York, Aldine Press, 1971; Robert Michael Field, "The Chinese Machine-Building Industry: A Reappraisal," *China Quarterly*, No. 54, Apr Jun 1973, pp. 313 314; and Thomas George Rawski, *The Economics of Chinese Machine Building, 1931 1967* (Doctoral Thesis), Harvard University, 1972.

[2] State Statistical Bureau, *Kung-yeh ch'an-p'in mu-lu (Index of Industrial Commodities)*, Peking, 1953, pp. 41 85. The major categories and subcategories of the code dealing with machinery and equipment are listed in Appendix B.

Table 1

Guide to the Grouping of Estimates, by Category

[1] See Appendix A.

Table 2

List of Principal Source References

Abbreviation	Reference
BBC	*British Broadcasting Corporation, Summary of World Broadcasts*, Part 3, the Far East, Weekly Economic Report, Reading, England.
CB	*Current Background*, Hong Kong, US Consulate General.
CCTP	*Ching-chi tao-pao* (*Economic Bulletin*), Hong Kong.
CCYC	*Ching-chi yen-chiu* (*Economic Research*), Peking.
CHCC	*Chi-hua ching-chi* (*Planned Economy*), Peking.
CHKY	*Chi-hsieh kung-yeh* (*Machine Industry*), Peking.
CHKYCP	*Chi-hsieh kung-yeh chou-pao* (*Machine Industry Weekly*), Shanghai.
CKHW	*Chung-kuo hsin-wen* (*China News Service*), Canton.
CKCKY	*Chung-kuo ch'ing-kung-yeh* (*Chinese Light Industry*), Peking.
Communique	*Kuan-yu fa-chan kuo-min ching-chi ti ti-i-ko wu nien* (*1953 nien tao 1957 nien*) *chi-hua chih-hang chieh-kuo ti kung pao* (*Communique on the Fulfillment of the First Five-Year Plan (1953–1957) for the Development of the National Economy*), State Statistical Bureau, Peking, 1959.
CP	*China Pictorial*, Peking.
CR	*China Reconstructs*, Peking.
ECMM	*Extracts from China Mainland Magazines*, Hong Kong, US Consulate General.
FBIS	*Foreign Broadcast Information Service*, Washington, DC.
HC	*Hung-ch'i* (*Red Flag*), Peking.
JMJP	*Jen-min jih-pao* (*People's Daily*), Peking.
JPRS	*Joint Publications Research Service*, Washington, DC.
KJJP	*Kung-jen jih-pao* (*Daily Worker*), Peking.
NCNA	*New China News Agency*, Peking and other cities.
Past and Present	*Wo-kuo kang-t'ieh tien-li mei-t'an chi-hsieh fang-chih tsao-chih kung-yeh ti chin-hsi* (*Chinese Iron and Steel, Electric Power, Coal, Machinery, Textile, and Paper Industries—Past and Present*), State Statistical Bureau, Peking, 1958.
PC	*People's China*, Peking.
PR	*Peking Review*, Peking.
SCMM	*Selections from China Mainland Magazines*, Hong Kong, US Consulate General.
SCMP	*Survey of China Mainland Press*, Hong Kong, US Consulate General.
TCKT	*Tung-chi kung-tso* (*Statistical Work*), Peking.
TGY	*Ten Great Years*, State Statistical Bureau, Foreign Languages Press, Peking, 1960.
TKP	*Ta kung pao* (*Impartial Daily*), Peking and Hong Kong.

Table 3

Production of Power and Electrical Equipment

Year	Steam Boilers (Metric Tons of Steam per Hour)	Hydro-turbines (Kilowatts)	Power Machinery (Thousand Horsepower)	Electric Generators (Kilowatts)	Electric Motors (Thousand Kilowatts)	Transformers (Thousand Kilovolt-Amperes)
1949.....	255	....	10	10,181	61.0	71.64
1950.....	585	....	11	22,798	199.0	....
1951.....	956	....	26	31,731	225.0	....
1952.....	1,222	6,664	35	29,678	638.7	1,167.08
1953.....	2,774	17,260	144	(59,525)	918.0	1,961
1954.....	2,885	10,000	172	54,617	957.0	1,961
1955.....	2,059	33,360	247	107,595	606.9	1,926
1956.....	3,022	102,749	657	288,263	1,069.0	2,891.07
1957.....	....	74,903	690	312,200	1,445.0	3,590
1958.....	....	....	2,000	1,425,000	6,052.0	12,000
1964.....	....	....	....	625,000	....	....
1965.....	...	....	....	780,000	....	....
1972.....	....	....	....	3,509,000	....	....

Notes and sources:

Steam boilers and hydroturbines: see Table 3-a.

Power machinery: see Table 3-b.

Electric generators, electric motors, and transformers: see Table 3-c.

Table 3-a

Production of Steam Boilers and Hydroturbines

	Steam Boilers		Hydroturbines	
	Units	Metric Tons of Steam per Hour	Units	Kilowatts
1949	209	255	....	....
1950	479	585	....	....
1951	782	956	....	....
1952	1,000	1,222	11	6,664
1953	....	2,774	....	17,260
1954	....	2,885	....	10,000
1955	1,274	2,059	....	33,360
1956	1,033	3,022	57	102,749
1957	....	....	....	74,903

Notes and sources:

Steam Boilers

Units

1949–52	*Past and Present*, p. 113.
1955	*Ibid.*, p. 139.
1956	*Ibid.*, p. 122.

Output per hour

1949–51	Calculated from the 1952 data as 1,222 tons per unit.
1952	*Past and Present*, p. 122.
1953	*CB*, No. 292, 15 Sep 1954, p. 3.
1954	*Ibid.*, No. 360, 29 Sep 1955, p. 3.
1955	*Past and Present*, p. 139.
1956	*Ibid.*, p. 122.

Hydroturbines

Units and kilowatts

1952, 1956	*Past and Present*, p. 122.

Kilowatts

1953	*CB*, No. 292, 15 Sep 1954, p. 3.
1954	*Osnovnye pokazateli razvitiye narodnovo khozyaystva kitayskoy narodnoy respubliki* (*Principal Indexes of the Development of the National Economy of the Peoples Republic of China*), State Statistical Publishers, Moscow, 1958, pp. 38–39. This is a Russian translation of a report published by the Chinese State Statistical Bureau.
1955	*CB*, No. 474, 12 Aug 1957, p. 3.
1957	*Tien-chi kung-yeh* (*Electrical Industry*), No. 10, 1957, p. 6.

Table 3-b

Production of Power Machinery

Thousand Horsepower

	Total	Steam Engines	Internal Combustion Engines		
			Total	Diesel	Other
1949	10	(6)	4	....	....
1950	11	....	....	....	....
1951	26	....	....	....	....
1952	35	7,458	27,621	17,995	(9,626)
1953	144	....	....	....	....
1954	172	....	....	..	....
1955	247	....	....	....	....
1956	657	(116,239)	540,761	371,700	(169,061)
1957	690	(81,000)	609,000	....	....
1958	2,000	....	....	....	....

Notes and sources:

Total power machinery

1949–58 — *TGY*, p. 97.

Steam engines

1952 — *Past and Present*, p. 142.

Total internal combustion engines

1949 — Chu-yuan Cheng, *op. cit.*, p. 253.

1952 — *Past and Present*, p. 123.

1956 — *Ibid.*

1957 — *Communique*, p. 7.

Diesel engines

1952 — *Past and Present*, p. 114.

1956 — *ECMM*, No. 105, 28 Oct 1957, p. 25.

Table 3-c

Production of Electric Generators, Electric Motors, and Transformers

	Electric Generators		Electric Motors (Thousand Kilowatts)	Transformers (Thousand Kilovolt-Amperes)
	Units	Kilowatts		
1949	....	10,181	61.0	71.64
1950	....	22,798	199.0	....
1951	....	31,731	295.0	....
1952	716	29,678	638.7	1,467.08
1953	....	(59,525)	918.0	1,961
1954	....	54,617	957.0	1,961
1955	2,517	107,595	605.9	1,926
1956	6,883	288,263	1,059.0	2,891.07
1957	....	312,200	1,445.0	3,590
1958	....	1,425,000	6,052.0	12,000
1964	....	625,000	....	....
1965	....	780,000	....	....
1972	....	3,500,000	....	....

Notes and sources:

Electric generators

Units

1952 — *Past and Present*, p. 115.

1955 — *Ibid.*, p. 139.

1956 — *Ibid.*, p. 113.

Kilowatts

1949-52 — *Ibid.*, p. 113.

1953 — *Ibid.*, p. 74, states that total output in 1953-56 was 510,000 kilowatts. Total output in 1954-56, according to the sources cited below, was 450,475 kw. Hence, 1953 output = 510,000 - 450,475 = 59,525 kw.

1954 — *CB*, No. 391, p. 2.

1955 — *Past and Present*, p. 139.

1956 — *Ibid.*, p. 123.

1957 — *TCKT*, No. 10, 1957, p. 6.

1958 — *PR*, 15 Sep 1959, p. 22.

1964-65 — The Chinese told visitors that output in 1972 was about 4.5 times that of 1965 which was 25% greater than in 1964. If output in 1972 was 3,500,000 kw (see below), output in 1965 was about 780,000 kw and in 1964 was about 625,000 kw.

1972 — Output in 1972 was 528,000 kw at the Peking Heavy Electrical Machinery Plant and 1 million kw at the Shanghai Electrical Machinery Plant (*Report, Canadian Electrical Power Mission to the Peoples Republic of China*, The Runge Press, Ltd., Ottawa, 1974). In estimating a total of about 3,500,000 kw for the year, it was assumed that the electrical plants at Te-yang and Harbin produced about the same levels of output as the Peking and Shanghai plants, respectively, and that smaller plants elsewhere in China produced a total of about 500,000 kw.

Electric motors

1949-58 — *TGY*, p. 97.

Transformers

1949 — *Tien-chi kung-yeh* (*Electrical Industry*), No. 10, 1957, p. 6.

1952, 1955-56 — *Past and Present*, pp. 114, 123, 139.

1953 — *CB*, No. 292, p. 3.

1954 — *CB*, No. 360, p. 3.

1957 — *CHKY*, No. 3, 1958, p. 3.

1958 — *TCKT*, No. 19, 1959, pp. 14-19.

Table 4

Production of Machine Tools

	Thousand Units	Metric Tons		Thousand Units	Metric Tons
1949	1,582	....	1962	25	....
1950	3,312	....	1963	35	....
1951	5,853	....	1964	40	....
1952	13,734	16,298	1965	45	....
1953	20,502	24,039	1966	50	....
1954	15,901	23,530	1967	40	....
1955	13,708	....	1968	45	....
1956	25,928	....	1969	55	....
1957	28,297	....	1970	70	....
1958	30	....	1971	75	....
1959	35	....	1972	75	....
1960	40	....	1973	80	....
1961	30	....			

Notes and sources:

Units

1949–56 *TGY*, p. 97.

1957 *PR*, 2 Sep 1958, p. 12.

1958–73 Official sources reported output of 50,000 units in 1958 (*TGY*, p. 97), 70,000 in 1959 (*PR*, 5 Apr 1960, p. 16), and a planned figure of 90,000 for 1960 (*Ibid.*, p. 12). These Leap Forward figures are obviously crude estimates and have been heavily deflated to exclude the huge volume of primitive machinery thrown together by unskilled labor in communes and small, poorly equipped shops during this period. Only about half of the reported output is believed to have been comparable in quality, durability, and utility to the 28,297 units reported for 1957. Estimates for 1958 and thereafter were derived from fragmentary reports on output trends and capacity additions at some 30 major machine tool plants. These estimates, for the most part, should be considered as minimum totals; in any given year, literally hundreds of small and medium-size machinery plants may have been assigned the tasks of producing a small assortment of standardized lathes, drilling machines, etc.

Metric tons

1952–54 *CB*, No. 429, 26 Nov 1956, p. 7.

Table 5

Production of Textile Machinery

Thousand Units

	Looms	Spindles	Sewing Machines		Looms	Spindles	Sewing Machines
1951.....	4,217	131,984	....	1960.....	....	....	676
1952.....	6,468	383,128	....				
1953.....	9,653	287,424	257	1964.....	....	700	1,257
1954.....	15,120	489,044	316	1965.....	....	1,400	1,571
1955.....	9,291	304,400	174	1969.....	....	....	1,800
1956.....	19,251	784,020	206	1970.....	....	....	2,400
1957.....	(12,300)	484	278	1971.....	....	....	3,000
1958.....	13,700	1,000	637	1972.....	....	....	3,300
1959.....	21,900	1,360	(563)	1973.....	....	....	3,894

Notes and sources:

Looms

1951–56	*Past and Present*, p. 161.
1958–59	*CB*, No. 618, p. 19.
1957	Total output through 1958 was 90,000 units (*NCNA*, Peking, 18 Sep 1959); through 1956 it was 64,000 units (*Past and Present*, p. 161). Hence, output in 1957 = 90,000 – 64,000 – 13,700 (1958 output) = 12,300.

Spindles

1951–56	*Past and Present*, p. 161.
1957–58	*CB*, No. 558, 20 Apr 1959, p. 3.
1959	*CKHW*, 11 Apr 1960, p. 12.
1964–65	Output of 1,400,000 units in 1965 was double output in 1964 (*NCNA*, 17 and 18 Dec 1965).

Sewing machines

1953–55	*CKCKY*, No. 16, 1957, p. 13.
1956–58	*Ibid.*, No. 5, 1959, pp. 3–4 (*JPRS*, No. 981–1, 23 Oct 1959).
1959	According to *JMJP*, 7 Apr 1960 (*FBIS*, 11 Apr 1960, p. BB23), total output in 1958–59 was 1,200,000 units. Hence, output in 1959 = 1,200,000 – 637,000 = 563,000.
1960	According to *HC*, No. 6, 16 Feb 1961 (*SCMM*, No. 256, p. 21), output increased by more than 20%.
1969–71	A visiting foreigner was told that actual output totaled 1,800,000 units in 1969 and that the 1971 plan called for 3 million units. Interpolation between these figures gives an estimate of 2,400,000 units for 1970.
1972	An increase of 10% was assumed.
1965	According to *NCNA*, Peking, 5 Oct 1973 (*FBIS*, 24 Oct 1973, p. B13), output in 1972 was 2.1 times the figure for 1965. Hence, 1965 output = 3,300,000/2.1 = 1,571,000 units.
1964	Output increased by 30% in the first quarter (*TKP*, Peking, 3 May 1965, p. 2) and by 20% to 47% in the first eight months (*FBIS*, 15 Oct 1965, p. eee2). On this basis, an annual increase of 25% was assumed. 1964 output = 1965 output/1.25 = 1,257,000 units.
1973	According to *NCNA*, Peking, 5 Oct 1973 (*FBIS*, 24 Oct 1973, p. B13), output in the first eight months increased by 18.6%. An annual increase of 18% was assumed.

Table 6

Production of Agricultural Equipment and Tractors

	Agricultural Machinery (Units)	Powered Irrigation Equipment (Thousand Horsepower)	Standard Tractors (Thousand 15-Horsepower Units)	Garden Tractors (15-Horsepower Units)
1949	....	....	....	....
1950	....	....	....	....
1951	....	....	....	....
1952	50,063	....	....	....
1953	100,664	....	....	....
1954	176,503	....	....	....
1955	736,935	....	....	....
1956	2,174,193	170	....	....
1957	....	(52)	....	....
1958	....	720	1.1	....
1959	....	1,255	9.4	....
1960	....	1,610	23.8	....
1961	....	700	(16.2)	....
1962	....	955	13.1	....
1963	....	640	15.7	....
1964	....	(860)	19.3	150
1965	....	1,150	23	875
1966	....	1,530	32	2,625
1967	....	....	27	2,100
1968	....	....	30	2,675
1969	....	....	40	3,200
1970	....	....	70	9,000
1971	....	3,089	105	9,625
1972	....	4,016	115	21,000
1973	....	5,984	138	28,000

Notes and sources:
Agricultural machinery: see Table 6-a.
Powered irrigation equipment: see Table 6-b.
Standard tractors: see Table 6-c.
Garden tractors: see Table 6-d.

Table 6-a

Production of Agricultural Machinery

Units

	Total	Plows	Seeders	Cultivators	Harvesters
1952	50,063	5,060	344	44,441	218
1953	100,664	3,007	4,590	92,533	534
1954	176,503	59,582	12,469	98,780	5,672
1955	736,935	522,697	24,533	179,502	10,203
1956	2,174,193	1,793,186	76,683	300,527	3,797

Notes and sources:
1952-56: *KJJP*, 21 Sep 1957.

Table 6-b

Powered Irrigation Equipment

Thousand Horsepower

	Inventory	Production		Inventory	Production
1949	97	....	1962	5,800	955
			1963	6,440	640
1951	118	....	1964	7,300	(860)
			1965	8,450	1,150
1955	(338)	....	1966	9,980	1,530
1956	508	170			
1957	560	(52)	1970	16,911	....
1958	1,280	720	1971	20,000	3,089
1959	2,535	1,255	1972	24,016	4,016
1960	4,145	1,610	1973	30,000	5,984
1961	4,845	700			

Notes and sources:

Where data on both inventory and production were not available, it was assumed that production in the current year was the difference between inventory in the current year and inventory in the previous year.

1949 inventory: *TKP*, Peking, 19 Dec 1957, p. 1.

1951 inventory: *PC*, 1 Oct 1952, p. 28.

1956 inventory and production: 390,000 horsepower of equipment was manufactured in 1952–56 (*ECMM*, No. 127, 5 May 1958, p. 48); hence, inventory in 1956 = 390,000 + 118,000 = 508,000. From 1 Oct 1955 to 30 Sep 1956, 170,000 horsepower were added (*ECMM*, No. 99, p. 1).

1955 inventory: 508,000 − 170,000 = 338,000.

1957 inventory and production: Inventory (*JMJP*, 14 Jan 1961); hence, 1957 production = 560,000 − 508,000 = 52,000.

1958–63 inventory and production: Figures for production in these years were reduced to account for discrepancies between official data reported from year to year and total capacity reported for 1957 and 1962. Yearly production and inventory figures indicate an addition of 7,486,000 horsepower during the period, whereas a later figure indicates that the inventory rose by 5,240,000 horsepower. Thus production figures derived from official data were reduced by 30%. The differences in official figures probably are due mainly to the manufacture of unusable equipment during the Leap Forward (1958–60). Derivation of the unadjusted and adjusted series is shown below (in thousand horsepower):

	Unadjusted Series		Adjusted Series	
	Inventory	Production	Inventory	Production
1957	560	52	560	52
1958	1,590 [1]	1,030 [2]	1,280	720
1959	3,380 [3]	1,790 [4]	2,535	1,255
1960	5,680 [5]	2,300 [6]	4,145	1,610
1961	6,680 [7]	1,000 [6]	4,845	700
1962	5,800 [8]	1,360 [9]	5,800	955
1963	6,440 [10]	640 [9]	6,440	640

[1] 560 + 1,030.

[2] 3,380 − 560 − 1,790 = 1,030.

[3] *CB*, No. 618, 17 May 1960.

[4] Planned output for 1960 was 2,500,000 horsepower, or 40% above actual output in 1959 (*CB*, No. 618, 17 May 1960). Hence, actual output in 1959 was 2,500,000 ÷ 1.4 = 1,790,000.

[5] 3,380 + 2,300 = 5,680.

[6] *NCNA*, Peking, 26 Sep 1962. The total figure for 1960–61 (3,300) is verified in *JPRS*, No. 13,828, 28 May 1962, p. 48.

[7] 5,680 + 1,000 = 6,680.

[8] *PR*, 28 Jun 1963, p. 20.

[9] Some 3,000,000 horsepower in equipment was added in 1961–63 (*CKHW*, 14 Aug 1964, p. 9) and 640,000 in 1963 (*FBIS*, 3 Jan 1964, p. ccc11). Hence, 1962 output = 3,000,000 − 640,000 = 1,360,000.

[10] 5,800 + 640 = 6,440.

1964 inventory and production: The inventory increased by 1.2 times over 1957 (*CR*, Mar 1965, p. 3): 1.3 x 500,000 = 7,300,000. Output in 1964 = 7,300,000 − 6,440,000 = 860,000.

1965 inventory and production: Output was one third higher than in 1964 (*Far East Trade and Development*, May 1967, p. 161): 1.333 x 860,000 = 1,150,000. Inventory = 7,300,000 + 1,150,000 = 8,456,000.

1966 inventory and production: Supplies were one third higher than in 1965 (*FBIS*, 9 Jan 1967, p. cee1): 1.333 x 1,150,000 = 1,530,000. Inventory = 8,450,000 + 1,530,000 = 9,980,000.

1970–73 inventory and production: 1971 inventory (*FBIS*, 23 Oct 1971, p. E1); 1973 inventory (*NCNA*, Peking, 16 Sep 1974). Output in the first eight months of 1972 was 30% higher than in the same period in 1971 (*NCNA*, Peking, 5 Oct 1972) and 49% higher in the first eight months of 1973 compared with the same period in 1972 (*FBIS*, 5 Oct 1973, p. B2). On the assumption that these rates of increase were maintained throughout the year, inventory and output were derived as follows:

Let I_{73} and I_{71} represent inventories at the end of 1973 and 1971, respectively, and Q_{71}, Q_{72}, and Q_{73} stand for production in 1971, 1972, and 1973. Then, in thousands of horsepower,

$$I_{73} = I_{71} + Q_{72} + Q_{73}$$

Solving this equation yields:

$$\begin{aligned} 30{,}000 &= 20{,}000 + 1.30Q_{71} + 1.49Q_{71} \\ 10{,}000 &= 2.79 \times 1.30Q_{71} \\ Q_{71} &= 3{,}089 \\ Q_{72} &= 4{,}016 \\ Q_{73} &= 5{,}984 \\ I_{69} &= 16{,}911 \\ I_{73} &= 21{,}016 \end{aligned}$$

Table 6-c

Standard Tractors

Thousand 15-Horsepower Units

	Inventory	Production		Inventory	Production
1949	0.401	..	1962	103	13.4
1950	1.286	..	1963	115	15.7
1951	1.410	..	1964	133	19.3
1952	2.006	..	1965	..	23
1953	2.719	..	1966	150	32
1954	5.061	..	1967	..	27
1955	8.094	..	1968	..	30
1956	19.367	..	1969	..	40
1957	24.629	..	1970	272	70
1958	45.330	4.4	1971	..	105
1959	59	9.4	1972	354	115
1960	70	23.8	1973	..	138
1961	..	16.2			

Notes and sources:

Production

Production of tractors began in 1958. Standard units mean the each type of tractor in terms of horsepower rather than physical units and thus provide an adjustment for differences in size, weight, complexity, and cost. China follows the practice of other Communist countries and converts each tractor to standard units of 15 drawbar horsepower. The drawbar horsepower of Chinese tractors ranges from 50% to 70% of the more commonly used brake horsepower. For most years, the tractor produced in the greatest volume probably has been a 54 brake horsepower model that develops 36 horsepower at the drawbar. One physical unit is equivalent to 36/15 = 2.4 standard 15-horsepower units.

1958: Production was 957 physical units (*TGJ*, p. 98). A perusal of reports about the tractor models produced in 1958 suggests that an average tractor was the equivalent of about 4.2 standard 15-horsepower units. Thus, 957 x 4.2 = 4,000 standard units. The estimate is consistent with a report that annual average output in 1960-64 (20,000 standard units) was about 20 time that of 1958 (*SCMM*, No. 315, 28 May 1962, p. 21).

1959: *Economic Statistics of the People's Republic of China*, Joint Economic Committee, Congress of the United States, Washington, D.C., 1965, p. 13.

1960: *Chung-kuo Ching-nien pao* (*China Youth Daily*), 12 Mar 1961.

1961: Output of 40,000 standard units was reported as the total for the two years 1960-61 (*SCMM*, No. 315, 28 May 1962, p. 21). Output in 1961 = 40,000 - 23,800 = 16,200 units.

1962-63: Output of 15,000 standard units was reported as the total for the three years 1961-63 (*CKHH*, Canton, 14 Aug 1964, p. 12). Output in 1962-63 = 15,000 - 16,200 = 28,800 units. Output in 1963 was about 20% above that in 1962 (*PR*, 3 Jan 1964, p. 12). Algebraically,

$$Q_{62} + Q_{63} = 28{,}800$$

$$Q_{63} = 1.20Q_{62}$$

Solving the 2 equations yields:

$$Q_{62} = 13{,}100$$

$$Q_{63} = 15{,}700$$

1964: Output in the first eight months was about 23% above that in the corresponding period of 1963 (*PR*, 11 Dec 1964, pp. 26-27). This rate of increase was assumed for the entire year.

1965-70: Rough estimates based on fragmentary information on output at the Loyang and other major tractor plants.

1971: Derived from the 1972 figure on the basis of a report that output in 1972 was 10% above that of 1971 (*FBIS*, 15 May 1973, p. B3).

1972: Output in 1972 was five times that of 1965 (*Economic Reporter*, English supplement, Hong Kong, No. 4, Oct-Dec 1973, p. 23).

1973: Output was six times that of 1965 (*CR*, Jan 1965, p. 6).

Inventory

These figures refer to tractors for use in agriculture.

1949-58: *TGJ*, p. 135.

1959: *PR*, 1 Mar 1960, p. 6.

1960: *PR*, 20 Jan 1961, p. 4.

1962: *PR*, 10 May 1963, p. 13.

1963: *PR*, 11 Dec 1964, pp. 26-27.

1964: *PR*, 1 Jan 1965, p. 8.

1966: Soviet source citing official Chinese figures (*FBIS*, Vol. III, 8 Nov 1974, p. C1).

1970: *PR*, 22 Oct 1971, pp. 5-7.

1972: Cheng Shih, *A Glance at China's Economy*, Peking, Foreign Languages Press, 1974, p. 18.

Table 6-d

Garden Tractors

Thousand Units

	Inventory		Production	
	Physical Units	15-Horsepower Units	Physical Units	15-Horsepower Units
1964	0.6	0.150	0.6	0.150
1965	1.1	1.025	3.5	0.875
1966	11.6	3.650	10.5	2.625
1967	23.0	5.750	8.4	2.100
1968	33.7	8.425	10.7	2.675
1969	46.5	11.625	12.8	3.200
1970	82.5	20.625	36.0	9.000
1971	121.0	30.250	38.5	9.625
1972	205.0	51.250	84.0	21.000
1973	317.0	79.250	112.0	28.000

Notes and sources.

Production of garden tractors was negligible prior to 1964. The garden tractor produced in the greatest volume probably has been a model with a brake horsepower of 7. Assuming a drawbar horsepower of 4, one physical unit is equivalent to about one fourth of a standard 15 horsepower unit. Figures in the table were derived by first estimating output in physical units and then dividing these estimates by 4 to obtain output in standard 15 horsepower unit.

With the exception noted below, the estimates were based on fragmentary reports of output trends at numerous, widely scattered, small-scale tractor plants. Inventory estimates were made by adding production in the current year to inventory in the previous year, with no allowance made for depreciation.

Production

1966: Output in the first nine months was up by 200% over that of the corresponding period in 1965 (*SCMP*, No. 3807, 25 Oct 1966, p. 14). This rate of increase was assumed for the entire year.

1970: Output in the first seven months was almost twice as high as that for all of 1966 (*CR*, Dec 1970, p. 20). Output in the first seven months was 21,000 and for the entire year was estimated as 21,000 x 12/7 = 36,000.

1972: Output was 24 times that of 1965. Cheng Shih, *A Glance at China's Economy*, Peking, Foreign Languages Press, 1974, p. 23).

1973: Output was 32 times that of 1965 (*CR*, Jan 1975, p. 6).

Inventory

1972: Inventory in 1972 was more than 50 times that of 1965. Cheng Shih, *op. cit.*, p. 18). 50 x 4,100 = 205,000. This estimate of inventory served as a control total in estimating output for the years not specifically listed above.

Table 7

Production of Transportation Equipment

	Mainline Locomotives (Units)	Freight Cars (Thousand Units)	Merchant Vessels (Thousand Tons of Light Ship Displacement)	Motor Vehicles (Thousand Units)
1949	..	3.155		
1950	..	0.696		
1951	..	2.882		
1952	20	5.792	6.1	
1953	10	1.501	11.8	
1954	52	5.446	51.4	
1955	98	9.258	50.2	
1956	181	7.122	51.2	1.654
1957	167	7.3	46.1	7.5
1958	350	11.0	56.6	16.0
1959	533	17.0	64.5	19.1
1960	602	23.0	41.1	15.0
1961	106	3.0	28.2	1.0
1962	25	1.0	23.1	8.1
1963	27	5.9	25.8	16.8
1964	27	5.7	31.2	20.3
1965	50	6.6	29.1	30
1966	140	7.3	19.8	13
1967	200	6.9	22.5	32
1968	240	8.7	18.0	27
1969	261	11	108.9	60
1970	285	12	193.2	70
1971	205	11	231.9	86
1972	225	15	163.5	100
1973	240	16	161.7	110

Notes and sources:

Locomotives and freight cars: see Table 7-a

Merchant vessels: see Appendix A

Motor vehicles: see Table 7-b

Table 7-a

Production of Mainline Locomotives and Freight Cars

Units

	Mainline Locomotives				Freight Cars
	Total	Steam	Diesel	Electric	
1949	...	...	...	...	3,155
1950	...	...	...	...	696
1951	...	...	...	...	2,882
1952	20	20	...	...	5,792
1953	10	10	...	...	4,501
1954	52	52	...	...	5,116
1955	98	98	...	...	9,258
1956	184	184	...	...	7,122
1957	167	167	...	...	7,300
1958	350	346	2	2	11,000
1959	533	530	3		17,000
1960	602	600		2	23,000
1961	100	100			3,000
1962	25	25			4,000
1963	27	25		2	5,900
1964	27	25	2		5,700
1965	50	20	30		6,600
1966	140	70	70		7,500
1967	200	100	100		6,500
1968	240	100	140		8,700
1969	261	100	160	1	11,000
1970	285	100	180	5	12,000
1971	205		200	5	11,000
1972	225		220	5	13,000
1973	240		240		16,000

Notes and sources:

Mainline locomotives:

1952-58: *TGJ*, p. 98.

1959: Planned output in 1960 was 800 units, an increase of more than 50% over that of 1959 (*PR*, 5 Apr 1960, p. 12); hence, 1959 output was 800 / 1.5 = 533 units.

1960-73: Estimated from fragmentary reports on production trends at major manufacturing facilities in Chu-chou, Dairen, Ta-t'ung, and Tsingtao.

Freight cars:

1949-52: *Past and Present*, p. 113.

1953: *CB*, No. 360, 29 Sep 1955, p. 3.

1954-55: *PC*, No. 11, 16 Jul 1956, supplement, p. 4.

1956: *Past and Present*, p. 123.

1957-58: *CB*, No. 556, 1959, p. 5, and *Communique*, p. 17.

1959: *Kung-lu* (Highways), Peking, 5 Dec 1959.

1960-73: Estimated from fragmentary reports on production trends at major manufacturing facilities in Ch'i-ch'i-ha-erh, Chu-chou, Dairen, and Wu-ch'ang.

Table 7-b

Production of Motor Vehicles

Thousand Units

	Total	Ch'ang-ch'un	Other		Total	Ch'ang-ch'un	Other
1956	1.654	1.654	...	1965	30	27.5	2.5
1957	7.5	7.5	...	1966	43	37.4	5.6
1958	16.0	16.0	...	1967	32	28	4
1959	19.4	19.4	..	1968	27	24	3
1960	15.0	15.0	...	1969	60	42	18
1961	4.0	4.0	..	1970	70	50	20
1962	8.4	7.3	1.1	1971	86	60	26
1963	16.8	(16.2)	0.6	1972	100	47	53
1964	20.3	19.5	0.8	1973	110	50	60

Notes and sources:

For all practical purposes, the Ch'ang-ch'un Motor Vehicle Plant was the only producer during 1956-64.

1956-58: *TGY*, p. 98.

1959: *JMJP*, 25 Jan 1960.

1960-61: Arbitrary estimates based on reports that Ch'ang-ch'un was extensively reorganized (*JMJP*, 22 May 1960), with assembly operations apparently reduced in order to expand production of spare parts (*Ibid*., 17 May 1961) and gasoline engines for mining locomotives (Radio Peking, 3 Oct 1960).

1962-64: As of Sep 1964, total output was running at an annual rate that was 2.7 time that of 1957. 1964 output, hence, was 2.7 x 7,500 = 20,300 (*SCMP*, No. 3386, 28 Sep 1964, p. 16). Total output in 1964 to be "more than 20%" over that of 1963, 20,300 / 1.21 = 16,800 (*Ibid*., No. 3391, 5 Feb 1965, p. 1). Total output in the first eight months of 1962 was double that of the same period in 1962, assuming this rate was maintained, 1962 output must have been around 16,800 / 2 = 8,400 (*CHKT*, 10 Oct 1963, p. 3). At Ch'ang-ch'un, output in 1964 was the highest ever; a minimum of 19,500 is assumed (*NCNA*, Peking, 30 May 1965). Output in 1963 at the Shanghai Truck Plant was about 600 units; so output at Ch'ang-ch'un was 16,800 - 600 = 16,200 units (*La Citta Futura*, Rome, No. 12-13, Jul-Aug 1965, pp. 14-16). Output at Ch'ang-ch'un in the first nine months of 1963 increased by 123% over the same period in 1962, assuming that rate was maintained, output in 1962 was 16,200 / 2.23 = 7,300 (*Wen-hui pao*, Hong Kong, 4 Oct 1963, p. 2).

1965-66: Output at Ch'ang-ch'un in 1965 rose by 10.8% over that of 1964: 1.11 x 19,500 = 27,500 (*CKHB*, 12 Apr 1966, p. 1). Total output is estimated to have risen to at least 30,000. Output at Ch'ang-ch'un in the first 11 months of 1966 was 36.3% higher than in all of 1965, assuming 36% for the year, 1.36 x 27,500 = 37,400 (*SCMP*, No. 3839, 13 Dec 1966, p. 21). Production at other plants in Shanghai, Nanking, Tientsin and Taiyuan is estimated at 5,600, hence total output was about 43,000 units.

1967-68: Figures are rough estimates based on fragmentary reports of work stoppages in Ch'ang-ch'un and elsewhere; see, e.g., *FBIS*, 15 May 1967, p. ddd2.

1969-73: A visiting foreign industrial group was told that total output in 1969 was 55,000 to 65,000 units (*American Machinist*, 27 Dec 1971, p. 21). Output at Ch'ang-ch'un in 1970 surpassed the plant's designed capacity by 67% (*PR*, 13 Aug 1971, p. 30); since the original capacity was 30,000 units, output in 1970 was 30,000 x 1.67 = 50,000. Output at Ch'ang-ch'un increased by 20% in 1971 (*JPRS*, No. 58070, 26 Jan 1973, p. 1); 50,000 x 1.2 = 60,000. Output at Ch'ang-ch'un in 1972 was 69.8% higher than in 1965 (*FBIS*, 27 Jul 1973, p. G2); 1.7 x 27,500 = 47,000. Output at Ch'ang-ch'un in the first six months of 1973 was 7.8% above that in the same period in 1972 (*Ibid*.); assuming 7% for the year, 1.07 x 47,000 = 50,000. Total output is estimated to have grown much faster than output at Ch'ang-ch'un during this period because of the proliferation of small-scale plants engaging in batch production of motor vehicles. By 1970 the Chinese reported that "cars and trucks are not only produced in large modern plants but over 20 provinces, cities, and autonomous regions have plants of their own turning out mostly trucks for local use under local conditions" (*CR*, Oct 1970, pp. 32-34).

Table 8

Production of Telecommunications Equipment

Thousand Units

	Radio Sets	Television Sets		Radio Sets	Television Sets
1953	25	....	1964	1,000	5
1954	28.5	....	1965	1,000	5
1955	123	....	1966	1,000	8
1956	(220)	....	1967	1,000	5
1957	390	....	1668	1,000	5
1958	1,200	....	1969	1,000	10
1959	1,560	....	1970	3,800	15
1960	1,500	....	1971	4,000	20
1961	1,250	2	1972	4,480	40
1962	1,000	3	1973	8,060	75
1963	1,000	3			

Notes and sources:

Radio sets

1953, 1957, 1960: Output in 1960 "was over 60 times more than in 1953" (*SCMP*, No. 2439, 17 Feb 1961, p. 10-11) and in 1957 and 1960 it amounted to 390,000 and 1,500,000 sets, respectively (*NCNA*, Peking, 8 Nov 1961); hence, output in 1953 was 1,500,000/60 = 25,000 sets.

1954: *KJJP*, 16 Jun 1958.

1955-56: Output in 1957 was 170,000 sets greater than in 1956 (*SCMP*, No. 1684, 6 Jan 1958, p. 5): 390,000 - 170,000 = 220,060 sets in 1956. Output in 1956 was 79% greater than in 1955 (Radio Peking, 9 Mar 1957): 220,000/1.79 = 123,000.

1958: *NCNA*, 9 Nov 1959.

1959: According to *Wu-hsien-tien* (*Radio*), No. 2, Feb 1960, at the end of 1959, output was four times that in the last stage of the First Five-Year Plan (assumed to refer to 1957).

1961-69: Estimated from fragmentary press reports on output trends in major radio plants.

1970: Sales of transistor radios increased by 280% compared with sales in 1969 (*BBC*/SWB/FE/W604/A/13, 13 Jan 1971); on the assumptions that sales equaled domestic production and that transistor radios made up 75% of production in 1965 and 95% in 1969-70:

	Total	Transistor Radios	Tube Radios
1965	1,000,000	750,000	250,000
1969	1,000,000	950,000	50,000
1970	3,800,000	3,600,000	200,000

1971: Output was four times that of 1965 (*FBIS*, 19 May 1972, p. B2).

1972: Output increased by 12% over 1971 (*FBIS*, 7 Aug 1973, p. B5).

1973: Assumes an 80% increase based on a report that output increased by 83.2% in the first five months (*FBIS*, 7 Aug 1973, p. B5).

Television sets

1961-71: Estimated from fragmentary reports on output trends in major television plants. China reportedly had 20,000 sets in use throughout the country in 1960 (*TKP*, Hong Kong, 4 Sep 1960) and 100,000 sets in use in 1971 (*South China Morning Post*, Hong Kong, 29 Nov 1972). Since China did not begin series production of television sets until 1961, the sum of the 20,000 sets (mostly imported) in 1960 and the accumulative production in 1961-71 should approximate 100,000 sets. The estimates do, in fact, sum to 101,000 sets.

1972-73: Output rose by 100% in 1972 and by 88.8% in the first few months of 1973 (*FBIS*, 7 Aug 1973, p. B5). The increase for 1973 is assumed to have been maintained throughout the year.

Table 9

Production of Consumer Products

Thousand Units

	Bicycles	Thermos Bottles	Clocks	Watches	
				Total	Shanghai
1949	11	...	...	...	...
1950	21	...	...	...	...
1951	41	...	...	...	...
1952	80	3,530	152	...	...
1953	165	12,007	306	...	...
1954	298	11,841	578	...	...
1955	335	17,958	812	...	...
1956	640	16,310	1,699	...	0.4
1957	806	20,870	2,040	...	...
1958	1,171	27,611	3,068	...	13.0
1959	1,479	37,000	5,700	...	71.6
1960	1,840	...	...	650	450.0
1961	631	...	...	...	545.0
1962	1,000	...	5,000	...	..
1963	1,101	33,216	...	...	..
1964	1,309	...	...	...	...
1965	1,702	...	...	1,200	840.0
1966	2,011	...	...	...	925.0
1968	2,412	..	...	...	..
1969	3,026	...	...	..	...
1970	3,640	...	...	...	..
1971	4,030	..	...	6,200	2,500.0
1972	4,300	..	..	6,950	2,500.0
1973	4,859	..	...	7,800	2,650.0

Notes and sources:

Bicycles

1949-58: *TGY*, p. 99.

1959: An estimated 25% increase, the increase as estimated for Shanghai - 262,000 units in 1958 and 330,000 in 1959 (*NCNA*, Peking, 3 Jan 1958 and 27 Dec 1960, *JPRS*, No. 4748, 30 Jun 1961).

1960: Output increased 22-fold compared with that in 1952 (*Wen-hui pao*, Hong Kong, 21 Mar 1961, p. 1) and was more than 20% greater than in 1959 (*SCMM*, No. 256, p. 21).

1961-62: Output in 1962 was estimated from data on five major plants (*SCMP*, No. 2827, 29 Sep 1962). Output in 1961 was estimated from a report that, in Shanghai, output in the first seven months of 1962 amounted to 92% of total output in 1961 (*NCNA*, Shanghai, 22 Dec 1962). 7/12 x 7.0/92 x 1,000,000 = 631,000.

1963: Assumes that the 10.1% increase reported for the first six months (*FBIS*, 13 Jul 1963, pp. eee8-eee9) was maintained throughout the year.

1964: Market supply was 50% greater than in 1957 (*FBIS*, 31 Dec 1964, p. eee2).

1965, 1971-72: Output in 1971 was five times that of 1957: 5 x 806 = 4,030 (*PR*, 13 Oct 1972, p. 11). Output in 1972 was 6.7% above that in 1971: 1.067 x 4,030 = 4,300 (*FBIS*, 19 Mar 1973, p. B5). Output in 1972 was 2.4 times that in 1965: 4,300/2.4 = 1,792 (*FBIS*, 24 Oct 1973, p. B13).

1966: An estimated 11% increase over 1960, the same increase as reported for Shanghai - 495,000 units in 1960 and 550,000 in 1966 (*NCNA*, Peking, 27 Dec 1960 and *CKHW*, 21 Oct 1966, p. 10).

1968: Assumes that the 18% increase in the first half of the year compared with the previous peak output for that period (1966) was maintained throughout the year (*FBIS*, 10 Jul 1968, p. B4).

1969: Interpolated between 1968 and 1970.

1970: Output was 260 times that in 1949 (*CR*, Feb 1972, p. 47).

1973: Output in the first eight months was 13% above that in the same period of 1972 (*FBIS*, 24 Oct 1973, p. B13).

Thermos bottles

1952: *CKCKY*, No. 20, 1957, pp. 2-4.

1953-55: *Ibid.*, No. 16, 1957, p. 13.

1956-57: *Ibid.*, No. 5, 1959, p. 3.

1958-59: *SCMP*, No. 2192, 9 Feb 1960, p. 13, and *CB*, No. 618, 17 May 1960, p. 1.
1963: *SCMM*, No. 446, 7 Dec 1964, p. 35.

Clocks

1952: *CKCKY*, No. 20, 1957, pp. 2-4.
1953-56: Calculated from percentage figures in *CKCKY*, No. 16, 1957, p. 11.
1957-58: *JPRS*, No. 3213, 13 May 1960.
1959: *SCMP*, No. 2192, 9 Feb 1960.
1962: *Ibid.*, No. 2806, 24 Aug 1962.

Watches

Shanghai

The figures for Shanghai probably are for Shanghai Watch Plant No. 1. Total output from all watch manufacturing plants in the city was 3,040,000 units in 1973 (*FBIS*, 17 Oct 1974, p. G5).
1956: Trial production (*NCNA*, Shanghai, 21 Mar 1957) — mass production did not begin until 1958.
1958-60: *Chih fang chih pao*, Shanghai, 14 Dec 1961, p. 2.
1961: *Ibid.*, also gave an 11-month figure of 500,000 for 1961 — this was extrapolated to 12 months.
1965: Derived from an estimated increase of 10% for 1966.
1966, 1972: Output in 1972 was 2.5 million, a 1.7-fold increase over 1966 (*TKP*, Hong Kong, 13 May 1973, p. 3); hence, output in 1966 = 2.5 ÷ 2.7 = 0.925 million.
1971: *CR*, Feb 1972, p. 18.
1973: *FBIS*, 23 Sep 1974, p. G3.

Total

1960: Planned production (*SCMP*, No. 2298, 15 Jul 1960).
1965: Derived by adding an estimated 850,000 for Shanghai as a whole, 153,500 for the Tientsin plant (Barry M. Richman, *A First Hand Study of Industrial Management in Communist China*, University of California, Los Angeles, 1967, p. 61), and at least 100,000 from a new plant in Nanking.
1971-72: Output in 1972 was 5.8 times that in 1965 (*FBIS*, 24 Oct 1973, p. B13) = 1,200 x 5.8 = 6,950 — and 12% above that in 1971 = 6,950 ÷ 1.12 = 6,200.
1973: Assumes that the 12% increase in the first eight months was maintained throughout the year (*FBIS*, 24 Oct 1973).

APPENDIX A

Merchant Shipbuilding

The Chinese have released a good deal of information about their merchant shipbuilding industry, but most of it is fragmentary and restricted to announcements of the launchings of major new vessels. Virtually the sum total of official aggregative statistics on nonnaval shipbuilding is arrayed in Table A-1. In filling the gaps in Table A-1 and extending the time series through 1959–73, several simplifying assumptions and adjustments had to be made. The methodology is explained step by step in the footnotes to Tables A-2 through A-4 and is briefly summarized here.

The first step involved the choice of an appropriate unit of measurement. Tonnage in terms of light ship displacement (LSD) was selected because it is the best measure for use in estimating construction costs. LSD of a vessel is calculated by subtracting the deadweight (DWT) tonnage from the full load displacement (FLD) tonnage. LSD is, in short, the weight of the ship fully equipped and ready for sea but empty (or "light") of cargo, passengers, stores, fuel, or fresh water.* LSD for the missing years 1953–55 and 1957–58 was derived by extrapolation (see Table A-2).

*Examples of Chinese use of the units FLD, DWT, and LSD can be found in *Chung-kuo tsao-ch'uan* (*China Shipbuilding*), Shanghai, No. 4, 15 Oct 1959 (translated in *JPRS* 2850, 17 Jun 1960).

Table A-1

Official Statistics on the Production of Merchant Vessels

Tons

	FLD[1]	DWT[2]	LSD[3]
1952	21,485	16,000	(5,485)
1953	....	35,000	....
1954	....	62,000	....
1955	....	120,000	....
1956	160,919	104,000	(56,919)
1957	....	54,000	....
1958	....	90,000	....
1959	..	122,300[4]	....
1960	....	168,000[5]	....

[1] *Past and Present*, p. 123.

[2] *TGY*, p. 98.

[3] Calculated from the equation FLD − DWT = LSD.

[4] Planned production (*CHKYCP*, 1 Oct 1959, p. 4).

[5] Planned production of "ships and barges" was to be 37% higher than actual production in 1959 (*PR*, 5 Apr 1960, p. 12). Actual production in 1959-60 was not reported.

Table A-2

Estimated Production of Merchant Vessels

Thousand Tons

	FLD[1]	DWT[1]	LSD[2]	LSD of Work Done[3]	LSD DWT Ratio
1951	Negl.	Negl.	Negl.	Negl.	....
1952	21.5	16	(5.5)	(6.1)	(0.34)
1953	....	35	(13.5)	(11.8)	(0.39)
1954	....	62	(26.9)	(31.4)	(0.43)
1955	....	120	(58.4)	(50.2)	(0.49)
1956	160.9	104	(56.9)	(51.4)	(0.55)
1957	....	54	(33.2)	(46.4)	(0.61)
1958	....	90	(62.2)	(56.6)[4]	(0.69)

[1] From Table A-1.

[2] The figures for 1952 and 1956 were taken from Table A-1, and those for 1953-55 and 1957-58 are estimates extrapolated by the Kaplan-Moorsteen method (Norman M. Kaplan and Richard H. Moorsteen, *Indexes of Soviet Industrial Output*, Santa Monica, 1960).

[3] These estimates of work actually done in each year were derived as a three-year moving average of LSD in which estimates for production during the preceding and following years were each weighted by 0.25 and production during the current year by 0.50.

[4] In deriving the moving average, LSD in 1959 was taken from Table A-1. LSD of major ships (25.6) was added to LSD of minor vessels (43.0) to obtain total LSD (68.6). Thus, work actually done in 1958 was calculated as follows: 0.25 x 33.2 + 0.5 x 62.2 + 0.25 x 68.6 = 56.6. Note that, for minor vessels, it is assumed that LSD of ships launched = LSD of work done.

LSD figures so derived were then adjusted to account for the fact that the actual work of construction and fitting-out in shipbuilding is usually spread over a year or more. Accordingly, LSD in "work done" terms was estimated by use of a three-year moving average in which one-fourth of the work done each year was allocated to the preceding and following years and one-half to the current year.*

Derivation of LSD estimates for later years required much more complicated procedures. Essentially, the "hard core" of the estimates was China's sporadic announcements of major ships completed. For example, official sources reported the launching in 1958 of the *Ho P'ing 28*, an oceangoing freighter with a FLD of 8,730 tons and a DWT capacity of 5,000 tons.** The sum of other such tonnages for specific ships announced in 1958 was about 37,200 DWT tons, or about 40% of China's total DWT tonnage reported for that year. In 1959, similar reports yielded a DWT figure of some 37,700 tons, or about 30% of the planned total production of 122,300 tons. Based on these percentages, it was assumed that the DWT of announced major ship launchings typically constituted one-third of total merchant shipbuilding for 1959–73 and that barges, tugs, and other smaller vessels accounted for the other two-thirds.

With estimates of the minimum DWT tonnages of major ships launched each year, a technique had to be developed for converting DWT into LSD tonnages. On the basis of the relationships detailed in Table A-3, the average LSD was assumed to represent 68% of DWT. Derivation of the estimates for total output of merchant ships for 1959–73 is explained in the footnotes to Table A-4.

As a rough test of feasibility, the estimates were compared with a somewhat ambiguous Chinese claim that ships built *in each* of the years 1971–73 exceeded in tonnage China's total for the preceding decade.*** The estimates are in close agreement with the Chinese claim if the statement is interpreted to mean that total tonnage for the *entire period* 1971–73 exceeded the total for 1961–70. The estimates show a total of 804,200 DWT for 1971–73 and 766,600 DWT for 1961–70. Clearly, the phrase "in each year" is a mistake in translation; for that to be true, output in 1971, 1972, and 1973 would have to be enormous and output in 1961–70 would have to be almost negligible.

*Cf. Robert Michael Field, "The Chinese Machine-Building Industry: A Reappraisal," *China Quarterly*, No. 54, Apr–Jun 1973, pp. 313–314.

**JPRS, No. 514-D, 3 Feb 1959.

***PR, 15 Feb 1974, p. 22.

Table A-3

Relationship Among Full Load Displacement, Light Ship Displacement, and Deadweight Tonnages of Chinese Merchant Vessels

Type of Ship and Year of Launching	Tons			
	FLD	DWT	LSD	LSD/DWT Ratio
Oil barge, 1955 [1]	5,100	3,700	1,400	0.38
Small tanker, 1971 [2]	7,800	5,000	2,800	0.56
Ocean tanker, 1969 [3]	22,000	15,000	7,000	0.47
Train ferry, 1957 [4]	4,950	2,416	2,534	1.05
Train ferry, 1959 [5]	5,090	2,878	2,212	0.77
River freighter, 1953 [6]	2,700	1,800	900	0.50
River freighter, 1954 [7]	2,000	1,000	1,000	1.00
Coastal freighter, 1959 [8]	4,850	3,465	1,385	0.40
Ocean freighter, 1958 [9]	8,730	5,000	3,370	0.67
Ocean freighter, 1958 [10]	22,100	13,400	8,700	0.65
Ocean freighter, 1959 [11]	9,420	5,000	4,420	0.88
Ocean freighter, 1965 [12]	18,800	11,700	7,100	0.61
Ocean freighter, 1967 [13]	19,000	13,000	6,000	0.46
Ocean freighter, 1970 [14]	20,000	12,600	7,400	0.59
Ocean freighter, 1973 [15]	22,000	13,000	9,000	0.69
Small liner/freighter, 1958 [16]	2,650	1,000	1,650	1.65
Total for the year				
1952 [17]	**21,485**	**16,000**	**5,485**	**0.34**
1956 [17]	**160,919**	**104,000**	**56,919**	**0.55**
Average of LSD/DWT ratios	....	....	....	**0.68**

[1] Tonnages were estimated from a photograph in *PC*, 16 Jan 1956, p. 19.

[2] The *Ta Ch'ing 409*, built by the Jung-hsing Shipyard in Tsingtao (*BBC*/SWB/FE/W630/A/9, 14 Jul 1971).

[3] The *Ta Ch'ing 27*, built by the Hung-ch'i (Red Flag) Shipyard in Dairen. For photos and details of this ship and others of the same class, see *CR*, Aug 1969, pp. 2, 4; *CP*, No. 11, 1969, pp. 4, 5, 11, and No. 9, 1971, p. 16; *SCMP*, No. 4514, 10 Oct 1969, pp. 10–11; *BBC*/SWB/FE/W611/A/8; and *PR*, 24 Dec 1971, p. 21.

[4] The *Shanghai*, built by the Chiang-nan Shipyard in Shanghai. See *JPRS*, No. 2850, 17 Jun 1960, pp. 59–61; *SCMP*, No. 1937, 20 Jan 1959, p. 30; and *SCMP*, No. 1955, 17 Feb 1959, p. 26.

[5] The *Kiangsu* and *Chin Ling*, identical ships built by the Chiang-nan Shipyard in Shanghai. See the sources in footnote 4.

[6] The *Ta Chung*, built by the Chung-hua Shipyard in Shanghai. See *Chugoku keizai no genjo to tembo* (*Present Condition and Future Prospects of China's Economy*), 1974 edition, published by the China Economy Research Bureau of Fuji Journal, Japan, p. 68; hereafter referred to as *Present Condition*.

[7] The *Jen Min 1*, built by the Hu-tung Shipyard in Shanghai. See *Present Condition*, p. 68.

[8] The *Ho P'ing 49*, built by the Shanghai Shipyard in Shanghai. For photos and details, see *JPRS*, No. 2850, 17 Jun 1960, pp. 1–49, and *SCMP*, No. 1955, 17 Feb 1959, pp. 25–26.

[9] The *Ho P'ing 25*, built by the Hung-chi Shipyard in Dairen. For photos and details, see *JPRS*, No. 514-D, 3 Feb 1959, p. 1; *CP*, Dec 1958, p. 31; *CR*, Nov 1963, pp. 6–10; *PR*, 13 May 1958, p. 5; and *PR*, 30 Sep 1958, p. 17.

[10] The *Yueh Chin*, built by the Hung-chi Shipyard in Dairen. For photos and details, see *CP*, 7 Jan 1959, pp. 24–25, and *PR*, 16 Dec 1958, p. 15.

[11] The *Ho P'ing 58*, built by the Chiang-nan Shipyard in Shanghai. For photos and details, see *SCMP*, No. 2139, 19 Nov 1959, p. 22; *CP*, 20 Oct 1959, p. 34; and *Evergreen*, Peking, No. 3, 1964, pp. 25–26.

[12] The *Tung Feng*, built jointly by the Chiang-nan and Hu-tung Shipyards in Shanghai. Several years were required to make this ship operational. For photos and details, see *SCMP*, No. 2246, 28 Apr 1960, p. 27; *PR*, 10 May 1960, p. 4; *CR*, Jun 1968, pp. 25–28, 44, and back cover; and *CP*, No. 6, 1968, pp. 20–23.

[13] The *Ch'ao Yang*, built by the Chiang-nan Shipyard in Shanghai. For photos and details, see *China's Foreign Trade*, Peking, No. 1, 1974; *JMJP*, 14 Jan 1967, p. 3; *CP*, No. 4, 1967; *CR*, Apr 1967, pp. 1, 28, and inside back cover; and *Present Condition*, p. 69.

[14] The *Feng Lei*, built by the Shanghai Shipyard in Shanghai. For photos and details, see *JMJP*, 10 May 1970, p. 2; *CR*, Sep 1970, pp. 26–28; and *FBIS*, 13 May 1970, p. C8.

[15] The *Feng Ching*, built by the Chiang-nan Shipyard in Shanghai. For photos and details, see *JMJP*, 5 Nov 1974, p. 4; *FBIS*, 10 Oct 1974, pp. E1–2; and *FBIS*, 5 Nov 1974, pp. E1–6.

[16] The *Min Chu 10* and *Min Chu 11*, identical ships built by the Chiang-nan Shipyard in Shanghai. For photos and details, see *PC*, 1 Dec 1955, p. 5; *PC*, 16 Jan 1956, p. 19; and *JPRS*, No. 488-D, 9 Jan 1959, pp. 6, 8.

[17] Fragmentary.

Table A-4

Estimated Production of Merchant Vessels

Thousand Tons

	Major Ships			Minor Vessels		Total	
	DWT of Ships Launched[1]	LSD of Ships Launched[2]	LSD of Work Done[3]	LSD of Work Done[4]	DWT of Ships Launched[5]	DWT of Ships Launched[6]	LSD of Work Done[7]
1959	37.7	25.6	21.5	43.0	63.2	100.9	64.5
1960	13.7	9.3	13.8	27.6	10.6	54.3	41.4
1961	16.2	11.0	9.4	18.8	27.6	43.8	28.2
1962	9.5	6.4	7.6	15.2	22.3	31.7	22.8
1963	10.0	6.8	8.6	17.2	25.3	35.3	25.8
1964	20.9	14.2	11.4	22.8	33.5	54.4	34.2
1965	15.5	10.5	9.7	19.4	28.5	44.0	29.4
1966	5.3	3.6	6.6	13.2	19.4	24.7	19.8
1967	13.0	8.8	7.5	15.0	22.0	35.0	22.5
1968	13.0	8.8	16.6	33.2	48.8	61.8	49.8
1969	59.0	40.1	36.2	72.4	106.4	165.4	108.6
1970	82.3	56.0	64.4	128.8	189.3	271.6	193.2
1971	155.2	105.5	77.3	154.6	227.3	382.5	231.9
1972	62.0	42.2	54.4	108.8	159.9	221.9	163.2
1973	41.0	27.9	53.6	107.2	157.6	198.6	160.8
1974	171.0	116.3	....	....	....	....	....

[1] These estimates should be considered minimum totals. They were compiled by adding up the tonnages of major ship launchings announced each year by the following Chinese newspapers and periodicals: *CP*, *CR*, *Ta Kung Pao*, *JMJP*, *PR*, and *TKP*. This information from direct sources was supplemented by translations of Chinese publications and monitored radio broadcasts by the *JPRS*, *SCMP*, *FBIS*, and *BBC*.

[2] Derived by multiplying column 1 by 0.68, the arithmetical mean of the 18 LSD/DWT ratios calculated in Table A-3.

[3] Derived by the moving average method described in footnote 3 in Table A-2.

[4] Derived by multiplying column 3 by 2.0. The assumption here is that work done on major ships typically accounts for one-third of total work done in any given year. This is based on the estimates for 1958-59, in which DWT of major ships launched accounted for about 30%-40% of total reported (1958) and planned (1959) production.

[5] Derived by multiplying column 4 by 1.47, the reciprocal of the 0.68 figure used in column 2 (LSD = 0.68 x DWT; DWT = 1.47 x LSD).

[6] Derived by adding column 1 to column 5.

[7] Derived by adding column 3 to column 4.

APPENDIX B

Major Divisions of the Metal Processing Sector [1]

Category Number		Category	Code Number
I		Power equipment	215 21942
	1	Steam boilers	2151 2155
	2	Boiler accessory equipment	2156
	3	Steam turbines	2159 21615
	4	Hydroturbines	2162 21624
	5	Steam engines	2163 21632
	6	Portable steam engines	2164 21642
	7	Internal combustion engines	2165 2172
	8	Gas producers	2173
	9	Electric generators	2175 217723
	10	Electric motors	2181 21842
II		Electric equipment	220 22475
	1	Transformers	2201 22033
	2	Mutual inductors for instruments	2205 22052
	3	Switching equipment	2216 22161
	4	Starting and control equipment	2219 22214
	5	Safety equipment	2225 22294
	6	Rectifying equipment	2231 22317
	7	Electrical appliances	2234 22363
	8	Electric light bulbs	2238 2242
	9	Storage batteries	2245 22457
	10	Dry batteries	2247 22475
III		Metal-cutting machine tools	225 23083
	1	Lathes	2251 2259
	2	Borers	2261 22612
	3	Drills	2263 2267
	4	Planers	2271 2273
	5	Slotters	2274
	6	Milling machines	2276 2284
	7	Drawing benches	2238
	8	Gear makers	2291 2295
	9	Grinders	2301 23019
	10	Thread cutters	2303 23033
	11	Tool grinders	2305 23054
	12	Metal saws	2306 23063
	13	Other metal-cutting machine tools	2307
	14	Electric spark machine tools	2308 23083
IV		Forging and pressing equipment	231 2348
	1	Forge hammers	2311 2314
	2	Presses	2316 2320
	3	Forges	2311 23412
	4	Punch presses	2342
	5	Shears	2343 23433
	6	Forming machines	2344 23445
	7	Tube drawing benches	2348
V		Casting equipment	236 2366
VI		Geological prospecting equipment	240 24512
	1	Testing drills	2401 24015
	2	Manual punch-drill testing drills	2402
	3	Hand-operated testing drills	2403
	4	Hydrologic drills	2451 24512
VII		Water conservation construction equipment	246 2461
VIII		Ore dressing and washing equipment	249 25012
	1	Dressing equipment	2491 24916
	2	Sintering equipment	2501 25012
IX		Metallurgical equipment	251 2551
	1	Metallurgical equipment for the ferrous metals industry	2511 25121

Major Divisions of the Metal Processing Sector (Continued)

Category Number		Category	Code Number
	2	Steel forming equipment	5451 5454
	3	Steel rolling equipment	5471 5474
	4	Other metallurgical equipment	5551
X		Coking equipment	558 5584
XI		Coal industry equipment	2601 26761
	1	Excavation machinery	2601 2614
	2	Loading and transport equipment	2621 26252
	3	Ventilation equipment	2626 26761
XII		Petroleum industry equipment	265 2684
	1	Well drilling rigs	2651
	2	Pumping well rigs	2652
	3	Well drilling tool	2653
	4	Oil well salvage fishing tool	2654
	5	Gusher prevention machinery	2655
	6	Oil and gas extraction machinery	2656
	7	Petroleum refining machinery	2657 26574
	8	Gas station machinery	2681 26812
	9	Barrel manufacturing machinery	2682
	10	*Tong* manufacturing equipment	2683
XIII		Chemical industry equipment	269 2786
	1	Evaporation equipment	2691 26964
	2	Absorption towers	2698 26982
	3	Distillation equipment	2701 27013
	4	Mixing equipment	2701 2707
	5	Filtration equipment	2711 2713
	6	Mechanical separation equipment	2715 2718
	7	Drying equipment	2721 2725
	8	Heating and cooling equipment	273 2732
	9	Crystallization equipment	274 2741
	10	Reaction equipment	275 2754
	11	Mechanical furnaces for the chemical industry	2761
	12	Other machinery	278 2786
XIV		Glass industry equipment	284 2819
XV		Building materials and refractory materials industry equipment	291 29156
	1	Forming machines	2911 29114
	2	Mechanical kilns	2912 29122
	3	Drying machinery; cement kilns	2914 29143
	4	Clay-working machinery	2915 29156
XVI		Lumbering and lumber milling equipment	295 2981
	1	Lumbering machinery	2951 29516
	2	Lumber making machinery	2955 29564
	3	Lumber milling machinery	2961 29619
	4	Pressed-board manufacturing machinery	2981
XVII		Paper industry equipment	300 30068
	1	Raw material processing machinery	3001 30016
	2	Pulp machinery	3001 30045
	3	Papermaking machinery	3006 30068
XVIII		Match industry equipment	3011 30119
XIX		Weaving, knitting, sewing, and printing and dyeing industries equipment	304 3225
	1	Cotton textile machinery	305 30819
	2	Wool textile machinery	310 3106
	3	Hemp textile machinery	311 3116
	4	Silk textile machinery	315 3195
	5	Knitting and sewing machinery	320 32151
	6	Printing and dyeing machinery	322 3225
XX		Tanning and shoe industry equipment	323 32512
	1	Tanning machinery	3231 32322
	2	Shoe manufacturing machinery	3251 32512

Major Divisions of the Metal Processing Sector (Continued)

Category Number	Category	Code Number
XXI	Printing industry equipment	3951 39917
1	Type foundry machinery	3951 39511
2	Printing machinery	3955 39553
3	Lithographic plate machinery	3985 39887
4	Bindery machinery	3991 39917
XXII	Food industry equipment	333 33416
1	Flour milling machinery	3331 33329
2	Edible oil and fats industry machinery	3351 33511
3	Sugarmaking machinery	3355 33561
4	Rice milling machinery	3381 33811
5	Cane meat manufacturing machinery	3102 310215
6	Noodle product machinery	3121 31213
7	Tobacco manufacturing machinery	3151 31519
8	Tea processing machinery	3171 31712
9	Dehulling machinery	3191 31916
10	Egg processing machinery	3511 35111
11	Cold drink and icemaking machinery	3531 35316
XXIII	Rubber industry equipment	362 36471
1	Rubber preparation machinery	3621 36212
2	Mastreating machinery	3623 36233
3	Lasting machinery	3625 36254
4	Vulcanizing machinery	3631 36311
5	Cutting machinery	3631 36311
6	Extrusion machinery	3635 36352
7	Setuping machinery	3637 36371
XXIV	Specialized equipment for other industries	3651 3701
1	Wire and nail making machinery	3651 36511
2	Electric wire making machinery	3671 36715
3	Bicycle making machinery	3691 36913
4	Other specialized machinery	370 3701
XXV	Construction and roadbuilding machinery	390 3923
XXVI	Agricultural machinery	395 3981
1	Tilling tools	3951 39552
2	Sowing machinery	3957 3961
3	Cultivating machinery	3962 3964
4	Harvesting machinery	3971 3975
5	Fertilizer applicators	3976 39762
6	Pesticide machinery	3978 39783
7	Irrigation water-lifting machinery	3979 39792
8	Fodder machinery	3980 39801
9	Grain sorting machinery	3981
10	Processing machinery	3982 398242
11	Windmills	3984
XXVII	Tractors	399 39983
	a. 15-horsepower units	3991
	b. Actual units	3992
1	Caterpillar tractors	3993 39933
2	Wheeled tractors	3995 39983
XXVIII	Railroad rolling stock and equipment	401 40121
1	Steam locomotives	4011 40123
	Steam locomotives, by type	4012
2	Diesel locomotives	4015
3	Electric locomotives	4016
4	Passenger cars	4017 40178
5	Freight cars	4021 40226
6	Parts for locomotives, passenger and freight cars	4025 40281
7	Rail line tools and materials	4031 40319
8	Signal equipment	4011 40116
9	AC line relays	40117
10	DC nonpolarized line relays	40118 40121

Major Divisions of the Metal Processing Sector[1] (Continued)

Category Number	Category	Code Number
IXXX	Structures and parts	405 40567
XXX	Merchant vessels	119 1273
	Self powered boats	1190
1	Seagoing boats	1191 1195
2	Coastal boats	120 1205
3	Inland waterways boats	121 1215
4	Special boats	123 1239
5	Working boats	1251 1262
6	Other boat machinery	127 1273
XXXI	Motor vehicles and parts	130 14155
	Motor vehicles	1301 1305
	Motor vehicle parts	1321
1	Vehicle engine parts	1322 13245
2	Front axle and steering mechanism parts	1331
3	Transmission parts	1351 13516
4	Rear axle and differential parts	1371
5	Brake system parts	1391
6	Shock absorber parts	1411
7	Body parts	1413 14131
8	Other parts	14151 14155
XXXII	Roller bearings	141 14142
XXXIII	Telecommunication equipment and parts	146 14814
1	Wire telegraph equipment	1461 14614
2	Telephone equipment	1463 14633
3	Telephone exchange equipment	1461 14614
4	Augmenters	1466
5	Wave carriers	1467
6	Wireless transmitters	1468 14683
7	Wireless receivers	1469
8	Small transceivers	1470
9	Radio receivers	1471
10	Amplifiers	1472
11	Broadcasting equipment	1473
12	Telecommunication equipment major parts	1477 14781
13	Hand-operated generators	1480
14	Electronic tubes	1481 14814
XXXIV	Hoisting and transporting equipment	150 15264
1	Elevators	1501 15012
2	Cranes	1502 1509
3	Transport machinery	1521 15216
4	Light mine car industrial railway rolling stock	1523 15264
XXXV	Pumps and air compressing equipment	151 15614
1	Pumps	1511 15118
2	Air compressors	1551 15513
3	Common air blowers	1561 15614
XXXVI	Crushing and grinding equipment	158 1588
XXXVII	Welding machinery	160 1604
XXXVIII	Industrial tools	162 16852
1	Cutting tools	1621 16218
2	Hand tools	1651 16517
3	Woodworking tools	1655 16553
4	Clamping tools	1661 16613
5	Pneumatic tools	1663 16633
6	Electric tools	1665 16553
7	Measuring tools	1667 16675
8	Grinding tools	1669 16695
9	Molding tools	1681 16814
10	Turning tools	1685 16852
IXL	Industrial equipment	170 1707
XL	Heating equipment	1801 1808

Major Divisions of the Metal Processing Sector [1] (Continued)

Category Number	Category	Code Number
XLII	Firefighting equipment	1831 18362
1	Firefighting machinery	1831 18312
2	Fire extinguishers	1832 18322
3	Fire hydrants	1834
4	Fire engines	1835 18352
5	Fire ladders	1836 18362
XLIII	Medical instruments	185 18023
1	Pharmaceutical machinery	1851 18517
2	Chemical pharmaceutical apparatus	1881 18814
3	Medical instruments	1891 18923
XLIII	Meters and testing equipment	493 49075
1	Inspection equipment	4931 49320
2	Instruments and meters	4941 49075
XLIV	Motion picture machinery and parts	510 5111
XLV	Electric wires	516 51911
1	Copper wires	5161 5166
2	Aluminum wires	5168 51681
3	Electric cables	5170 51725
4	Other alloy and metal electric wires	5191 51911
XLVI	Metal structures	5[illegible] 5212
XLVII	Cultural and consumer products	5331 5502
XLVIII	Metal products	6011 60538

[1] State Statistical Bureau, *Kung-yeh ch'an-p'in mu-lu* (*Index of Industrial Commodities*), Peking, 1953, pp. 41–85.